

APOLLO 8 MISSION COMMENTARY, 12/22/68, GET 352800, CST 6:20P, 119/1

SC Houston, Apollo 8, are you reading?
CAP COM Loud and clear, Apollo 8. I'm going to
have a maneuver pad and -
SC Houston, Apollo 8, are you reading?
CAP COM I read you loud and clear, Apollo 8.
CAP COM Apollo 8, Houston.
SC Houston, Apollo 8, Houston, Apollo 8,
how do you read?
CAP COM Apollo 8, loud and clear.
SC Hello Houston, Apollo 8, go ahead.
CAP COM Apollo 8, Houston. I'm afraid we've
lost our uplink. I'm transmitting in the blind. Read you
loud and clear.
SC Houston, Apollo 8. Houston, Apollo 8,
how do you read?
CAP COM Apollo 8, Houston, read you loud and
clear. We may have some uplink problems. Transmitting in
the blind, at this time. Over
CAP COM Apollo 8, Houston. Apollo 8, Houston.
Apollo 8, Houston.
HAW Hawaii Network GOSS Conference, how do
you read?
SC Houston, how do you read Apollo 8?
CAP COM Apollo 8, I read you loud and clear.
How me?
SC Houston, Apollo 8. How do you read?
CAP COM Apollo 8, Houston, over.
SC Go ahead, Hawaii, Apollo 8, how do you
read?
CAP COM Apollo 8, Houston. Read you loud and
clear.
SC Okay, thank you, Hawaii. How do you
read?

END OF TAPE

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PAO This is Apollo Control in Houston at 35 hours 37 minutes. We have reestablished our communications from the ground up to the spacecraft directly from Houston, and preliminary assessment one the problems is that it originated at the Goddard Space Flight Center where all of communications are routed through on route to Houston. Apparently we blew a fuse at Goddard and our communications circuit between Goddard and Hawaii was down. We were able to receive the spacecraft communications loud and clear here in Houston, and we were able to relay information through the station at Hawaii through the maintenance and operations people at Hawaii to the spacecraft. The link between Houston and Hawaii was restored after about 20 minutes and we're now in conversation with the spacecraft. We'll pick up that conversation for you and then follow it as it occurs.

CAPCOM Apollo 8, Houston.

SC Go ahead Houston, Apollo 8.

CAPCOM Okay, we got back together again. You're loud and clear. We've been reading you. We have a problem down here on the ground getting our signal from MCC at remote site.

SC Roger. I understand.

CAPCOM Apollo 8, Houston. I've got a ball score for you. It was Oakland 41-Kansas City 6. That was the final score. It was 41 to 6 Oakland. We're trying to get some news releases over here for you. I suspect we're going to find that the staged TV show was probably the biggest news of the day.

SC Say, that's the greatest. I'm sorry that the TV vamps broke down.

CAPCOM Well, we're working on that some more. I'm not sure that the whole thing is lost yet. It appears that our problem is one where the light intensory which is sensed by our light meter in there is picking up an average field which is much larger than the Earth, and so it's something of a great deal of deep space environment which is dark and we're suspicious of this is probably opening up the lens aperture as wide as it will go, and then when you point the camera at the Earth while the Earth is only filling about 3 degrees of cone angle, whereas lens takes in 9. So it looks like you're probably just saturating the tube. Now we're pondering around now with some -

SC We just lost you again, Houston.

CAPCOM Say again.

SC I just lost your last transmission, you weren't clear (garble)

CAPCOM Okay. Did you get any of my comments about the TV, too.

SC Rog. I got them.

CAPCOM Okay. What I - what we've got in mind

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here is that we are looking at some of the lenses you have onboard for cameras, and we are going to see if one of them can possibly be used to attenuate some of this light so that you will be able to take one of these pictures. We are running some tests now, and we will let you know about those. I also have a maneuver PAD that I need to read up to you whenever it is convenient.

SC Let me get a pencil, it will be fine right now.

CAPCOM Okay.

SC Go ahead Houston.

CAPCOM Okay. The first one I will give you is a TLI plus 44 maneuver PAD. I will start reading down the left hand column. TLI plus 44, SPS G&N 62970 minus 162 plus 129046560431 plus 00197 plus all zeros, plus 60701180133001 November alpha plus 002036070170460451121375349 far sight star is Earth down 037 right 22 plus 1068 minus 1650012856361180982717. The PDC alignment stars the primary star is Sirius, secondary Rigel 010 294 320 no ullage path return P-37 Delta-V 87 50. This goes to the Indian Ocean and requires a high-speed procedure. That is minus Mike Alpha and that will refer to your check list page November Charlie 1. Over.

SC Okay. How do you read us?

CAPCOM Loud and clear.

SC TLI plus 44 SPS G&N 62970 minus 162 plus 129046560431 plus 00197 plus all zeros plus 60701180133001 plus 00203 plus 6070170460451121375349 Earth down 037 right 2.2 plus 1068 minus 16512856361180982717 Sirius and Regil . Hello Houston, How do you read now?

CAPCOM Loud and clear

SC Sirius and Rigel 010 294 320 no ullage path return P-37 Delta-V 87 50. Indian Ocean

END OF TAPE

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SC Houston, how do you read now?
CAP COM Loud and clear.
SC Sirius and Rigel, 010 294 320, no
ullage. Past return P-37 delta V 8750. Indian Ocean
minus 70, check list in state 1.
CAPCOM That's affirmative, Apollo 8. And I
have a flyby path for you also.
SC Go ahead.
CAPCOM Okay, in this flyby path is an update to
one that we gave you yesterday so you might want to note that
this is the second one. And it will be a flyby SPS G&N.
62970 minus 162 plus 129, 060 59, 4807 plus 00966 plus 00552
minus 02079, Roll, pitch, and yaw are all zeros. November
Alpha, perigee height plus 00202 02358 022 02281 030407 317
013 up 047 right 39 plus 1418 minus 16505, 12904, 36160,
1462912. Primary star Sirius, secondary Rigel, 136 310 340.
No ullage. Requires realignment to preferred REFSMMAT.
This burn will raise perilune to 550 miles. Over.
SC Okay, Houston. The second flyby SPS G&N.
Are you with me?
CAPCOM Yes sir.
SC 62970 minus 162 plus 129 06059 4807 plus
00966 plus 00552 minus 02079. Next three are all zeros.
NA plus 00202 02358 022 02281 03 0407 317 013 up 04.7 right
3.9 plus 1418 minus 16505 plus 12904 plus 36160 1462912.
Sirius, Rigel, 136 310 340. No ullage. Requires realignment
to preferred REFSMATT. Peri lifted to 550 miles.
CAPCOM That's correct, Apollo 8.
SC Thank you.
SC Houston, Apollo 8.
CAPCOM Go ahead, Apollo 8.
SC Okay. The CMP is now up so I will
proceed with the 52 option and turn on the cislunar navigation
CAPCOM Okay, thank you. We'll start looking
for some star data.
SC For the low bit rate.
CAPCOM Apollo 8, Houston.
SC Go ahead, Houston, Apollo 8.
CAPCOM Okay, when you pick up your activities,
I have a preferred alignment here that I want you to be in
when you do your P-52 and I'll have about four items to
change on your timelines so if you'll give me a call when
you're ready for it.
SC We're ready right now. We were doing
the P-52. You want to hold off and go to a particular
alignment, is that right?

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CAPCOM Affirmative.

SC All right, I'm ready.

CAPCOM Okay, the attitude is pitch 23.4, roll 184.7, yaw 14.3. And the reason we're doing the alignment in this attitude is the next thing we'll be coming up with is the scanning telescope visibility test and that will be 70 degrees Sun and Arcturus with a shaft and trunnion of zero. And then we can go ahead with the P-52 and then a trunnion bias followed by P-23 with the same stars we read to you before.

SC Okay.

SC Houston, Apollo 8. We're maneuvering to the angles you gave us.

CAPCOM All right. Affirmative.

END OF TAPE

APOLLO 8 MISSION COMMENTARY, 12/22/68, GET 360000, CST 6:53 122/1

PAO This is Apollo Control. We don't appear to have anymore communications developing between the ground and the spacecraft at this time. During that previous conversation part of the information that was passed up to the crew from the ground were routine updates to the backup information that is carried onboard the spacecraft to allow the crew to return to Earth at various points in the flight should it become necessary, and should at that point not be able to get updated information from the ground. This includes returns at 25 hours after, rather 35 hours after translunar injection, another point at which we pass up this so called block data. As for 44 hours after translunar injection, and the crew has also been updated with the information they would need if they elected not to go in orbit around the Moon, but rather to do a flyby. This type of information passed up routinely at certain specified periods during flight. At 36 hours 4 minutes into the mission, Apollo 8 is now at an altitude of 134 264 nautical miles from Earth, and the velocity is 4258 feet per second.

END OF TAPE

APOLLO 8 MISSION COMMENTARY, 12/22/68, GET 362300, CST 7:15 123/1

PAO This is Apollo Control, Houston, at 36 hours 23 minutes into the flight. Apollo 8 at this time is at a distance from the Earth of 134 rather 135 042 nautical miles, and the current velocity is 4236 feet per second. Jim Lovell who had been asleep for what appears to have been about 2 hours is now up, and we've heard from him aboard the spacecraft. At the present time Lovell is involved in some midcourse navigation using the onboard Guidance and Navigation system. We have some of his comments made during the past few minutes of conversation made with the ground on tape which we'll play back for you now, and then we'll stand by for any live communication with the spacecraft that follows.

SC First control came there 20 seconds, 2 m. Houston, we've reached the perferred attitude, and we're proceeding with the P52.

CAPCOM Okay, real fine, and pass up some advise from your friendly Flight Surgeon, he says you're supposed to take one more Ramtil.

SC Is that everybody or just me?

CAPCOM Just Frank.

SC Houston, P52 is completed, and we're ready for your other data.

CAPCOM Okay, understand that you've done the P52. The next item on the flight plan should be a scanning telescope visibility test, and this is the same one that was one your flight plan previously at 34 hours and about 12 minutes, and we'll be checking that 70 degrees sun Arcturus. Following that we need to make a trunnion bias check, and then we'll go into a P23, and I can read you those star numbers and sets if you don't have them from the last time I read them up.

SC Stand by. Houston, Apollo 8.

CAPCOM Go ahead.

SC With such good visibility, such good communications, we'll just give you a verbal description without using the scanning telescope right now. Your angles for maneuvering for Arcturus were quite good. The guide on Arcturus is better than the scanning telescope. At this sun angle there is a shaft of light directly across the center of the scanning telescope, and it's a band of light. It precludes seeing a lot of stars around us, and although I kept my eye glued to the telescope for some times, it's very difficult to see any star patterns or anything. I couldn't recognize that with Arcturus unless I - the objects just drove me there. Now because I'm near zero shaft and zero trunnion, I'm getting quite a bit of shaft movement. Every-time the shaft moves more particles leave the optics, and

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they're just as bright as surrounding stars. And they make appearance of stars, and you can't tell star patterns or constellations. With this particular attitude, the shaft excludes any identification of constellations or individual stars.

CAPCOM Okay, copy that. Can you tell us something about the orientation of this band. You mentioned that last night that you also had a band about 10 degrees wide that ran across. Is there no orientation that we can tie that to.

SC I believe so. This band is parallel to the M-line. And I think it has something to do with the design of the optics where we have that shaft or the rectangular entrance of the optics from the outside. This particular sun angle is runs right across. Now I noticed that both the Earth and the sun do this to the scanning telescope. In the sextant, the same light band is there, although it covers the entire sextant's field of view. However, the magnification brings out the stars quite well, and it is possible to mark on them. But the identification of the stars with the scanning telescope makes it very difficult. Now the attitude that I found the optics are best at, are the attitudes which give the constellations Gienah Major and Orion in the scanning telescope. At this particular attitude of the spacecraft the band is gone; we're at a position where by the sun is behind us, and I can see quite a few stars. Now yesterday I could also after getting dark adapted see quite a few stars around the constellation Capella which at first I couldn't. Right now this band includes what I can see all except Arcturus which of course I know we're aiming at right now.

CAPCOM Okay, thank you very much.

SC What stars did you want to use? Did you want to read them off.

CAPCOM Okay, first star will be 26, and we'll be making two sets of measurements, Earth near horizon using star 26. Then we would like to have one set on star 16, that's 16 using the Earth far horizon. It turns out that star 26 Earth near horizon is not possible, then we'd like to have star 16 on the Earth far horizon one set, and star 22 Earth far horizon one set, over.

SC You want star 26, Earth near horizon, two sets; star 16, Earth far horizon, one set; and star 22, Earth far horizon one set.

CAPCOM Okay, that's star 22 only in the event that 26 is on the Earth's near horizon is not possible, over.

SC We won't even do star 22 then unless we can't get star 26 on the near horizon.

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CAPCOM That's affirmative.

SC Com sure is good all of a sudden, isn't
it?

CAPCOM Yes, this is outstanding.

PAO This is Apollo Control. It appears we will
have no further communication with the crew for the moment
anyway. Shortly we would expect that Frank Borman would
attempt -

END OF TAPE

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PAO . . . would attempt to get a few hours rest. He indicated earlier that as soon as either Lovell or Anders awoke that he would attempt to get several hours of sleep. At the present time, Apollo 8 is at an altitude of 135,442 nautical miles and our velocity is 4225 feet per second. This is Apollo Control at 36 hours 33 minutes into the flight.

END OF TAPE

PAO This is Apollo Control at 36 hours 55 minutes into the flight of Apollo 8. At present time we are in communication with the spacecraft. Jim Lovell is the only one of the three crewmen who is awake at the present time. Indications at this time are that both Frank Borman and Bill Anders are resting. And here in Mission Control Center as well as onboard the spacecraft, activities have slowed down somewhat and it has become quite quiet here. At the present time, Lovell has just finished a series of star sightings for onboard navigation. And we are in the process of passing up some pad data to the crew. We will pick up with the first part of this conversation recorded and then when we will catch up, we will continue on live.

SC Houston. Apollo 8.
CAP COM Go ahead, Apollo 8.
SC Okay, we have completed two sets on
26 and one set on 16.
CAP COM Roger. Getting pretty speedy there.
SC Jim is getting to know the objects.
SC Are you receiving the data, Houston?
CAP COM Affirmative.
SC Okay.
CAP COM Keeping you on it.
SC That's right.
CAP COM Okay, Apollo 8. We have looked at the
data and it looks good and feel like you can go back to
PTC attitude anytime you are ready to. And if you can -
go ahead.
SC What attitude did you use? The same
one?
CAP COM That's affirmative. Okay, if you can
reach over Bill there and get to panel 3.1 believe we
would like to cycle the oxygen fans. And also like to get
the biomed switch over to CMP.
SC Okay.
CAP COM If you have to bother Bill, to do that
why we can hold off on the cryo fans.
SC No, he moved. We already chased him
under the seat. Okay, now you want just the oxygen fans
on?
CAP COM That's affirm. Turn one on for about
2 minutes and when we turn it off, then we will turn the
next one on. We don't want to turn them on simultaneously
though.
SC I know that. I mean you don't want
hydrogen though?

CAP COM That's affirmative. Just the oxygen.
CAP COM Go ahead.
SC Ken, just to be careful, I would like some explanation on your maneuver path, something which I'm really not knowledgeable about, the way it was presented to us, Jim mentioned fast return P37 Delta V of 8750, just briefly clarify that, will you please?
CAP COM Okay, stand by.
SC Can you give us a little report on how our trajectory looks and the tracking is going and things like that?
CAP COM Okay, sure will. I will put a summary together here.
SC The pericynthian sign
CAP COM Rog. We will get all that together for you in just a few minutes.
SC And we never did get the news.
CAP COM You are the news.
SC (garbled)
SC Okay, the fans have been cycled 2 minutes each and they are back off.
CAP COM Okay, thank you very much.
SC Houston, Apollo 8 is back in the PTC attitude, reads MHPTZ.
CAP COM Okay, thank you. And in reference to your question about the P37 Delta V, 8750, that's the number that goes into option at P37 for your minimum time return. That gives you a target for the Indian Ocean. And in this case, we are going to have use the high-speed procedures that we worked out for you to use some minus number for the major axis.
SC Roger. Understand. I'm going to give that a try, Ken, in a run through. I tried it yesterday. I wasn't getting too much in the way of results. I will give it a try today.
CAP COM Okay. And on the - your tracking that we have now, it still looks like the time we gave you last night for time of pericynthian is still good, 59 plus 10 and right now your fly by earth pericythian altitude is 65.8. Looks like the midcourse number 3 is going to be something less than 1 foot per second. and all trajectory parameters are still holding real fine.
SC That's the things we like to hear. We would like to keep those holding very much.
CAP COM Roger.

END OF TAPE

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PAO This is Apollo Control. There appears to be no further conversation with the crew, at this time, so we will take the circuit down for the time being. At the present, the mission appears to be going very well. Right on the flight plan, in most cases, and our crewmen reported earlier that they were feeling much better. A short while ago, the medics advised Frank Borman to take one additional lomitol tablet. This is a pill to reduce bowel activity. We've heard no word from the crewmen of any physical problems they're having and the feeling here on the ground is that their condition is improving. We're at a quiet period in the flight plan. Frank Borman had indicated earlier that he planned to get some sleep beginning at about 37 hours ground elapsed time. We heard from him at the beginning of the last transmission and deduced from that that he had still not, at that time, gone to sleep. However, it has been quiet now for sometime so perhaps he is getting some rest, at this point. At the present time, Apollo 8 is 137 127 nautical miles from Earth and is traveling at a speed of 4178 feet per second. At 37 hours 14 minutes into the flight, this is Apollo Control.

END OF TAPE

HOUSTON Hawaii, Houston GOSS Conference, How
do you read?
HAW Network voice, Standby okay.
HOUSTON Hawaii, Houston on GOSS Conference.
Hawaii, Houston Network, GOSS Conference.
HAW Houston, Network, Hawaii NET 2.
HOUSTON Hawaii, Houston on GOSS Conference,
How do you read?
HAW Houston Network, Hawaii.
HOUSTON Hawaii, this is Houston, am I on your
GOSS Conference now?
HAW I'm reading you on our NET 2 line.
HOUSTON Okay, that's good. At the present time
NET 2 is being utilized for GOSS Conference.
HOUSTON Hawaii, Houston. GOSS Net 2. Hawaii,
Houston, NET 2.
HAW Houston, Hawaii, NET 2.
HOUSTON Hawaii, take your carrier down.
HAW Roger.
HAW Hawaii, unable to come in. Carrier down.
HOUSTON Hawaii Network.
HAW Network, Hawaii.
HOUSTON Roger, Leave your carrier up.
HAW Roger, we'll have to bring it up again.
HOUSTON Okay.
HAW AOS
HOUSTON Hawaii, go for command, CSM.
HAW Roger.
HOUSTON Hawaii, do you have your NET 2 patched
in to key to ours.
HAW Roger.
HOUSTON Okay.
HAW Hawaii, LOS, unable to find.
CAPCOM Apollo 8, Houston. Apollo 8, Houston.
CAPCOM Hawaii, this is Houston, CAP COM, over.
HAW This is CAP COM, Hawaii, over.
CAPCOM Hawaii, Houston CAP COM. I would like to
have a voice check.
HAW Roger, I read you loud and clear.
CAPCOM Okay, I'm reading you loud and clear.
I understand you have contact with the spacecraft. Is that
affirmative?
HAW I have uplink voice to the spacecraft,
the downlink is too low in the mud.
CAPCOM Okay, understand that you have good up-
link, but your downlink is in the mud. You don't have any
way of copying it either, is that correct?

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HAW That is affirmative.
CAPCOM Okay, Hawaii, we can hear Apollo 8 calling
down. Would you answer and tell them that we did copy that.
HAW Roger.
HAW Apollo 8, ... Houston reports they copied
your last.
SC Okay, Thank You.
CAP COM Apollo 8, Houston. Over.
HAW Hawaii, Houston Network, GOSS Conference.
HAW Hawaii, Houston Network, GOSS Conference.
Your NET 2
HOUSTON Houston Network, Hawaii.
HAW Roger. Did you copy the CAP COM?
HOUSTON Affirm. We copied the CAP COM.
HAW Is he keying the transmitters out there?
HOUSTON He did key it one time Network.
HAW Okay. I'm going to ask him to call the
spacecraft again and I would like for you to give me a re-
port if he does not key the transmitters.
HOUSTON Roger, Network is NET 1
HAW Your NET 2 is conference to our GOSS
conference here.
HOUSTON Roger, How about our GOSS conference loop.
HAW Your GOSS conference loop is dead.
HOUSTON Roger, we are Go for command. We were
unable to count that before.
haw Understand.
HOUSTON We transmitted to the spacecraft as per
CAPCOM and they acknowledged our transmission.
CAPCOM Hawaii, Houston.

END OF TAPE

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PAO This is Apollo Control Houston at 37 hours 42 minutes into the flight of Apollo 8. At this time, the spacecraft is 138,226 nautical miles from the Earth and traveling at a speed of 4148 feet per second. It's continued to be relatively quiet here in Mission Control and the flight plan also shows relatively little activity onboard the spacecraft for the crewmen. Both Frank Borman and Bill Anders are scheduled to be sleeping at this time. The crew is following the ground advice that was passed up earlier from Mission Control Center that they pace themselves and set their own work/sleep cycle to fit in with their own feelings and they appear to be following that advice. We do have some communication with the spacecraft over the past 15 or 20 minutes. We'll play that back for you now and then stand by for any live conversation with the spacecraft.

SC Houston, Apollo 8.

CAPCOM Go ahead.

SC Roger, we're getting near - we're going to need to dump urine overboard here. I wonder if that's going to fire your trajectory up. Or can we go ahead and do it?

CAPCOM No, that's okay. Something that is kind of interesting though is that the last time you had your water dump, they noticed a change in the trajectory tracking at the same time and they got through correlating it, they found some fellow that thought he knew the characteristics of a nozzle and how much water you're dumping and his estimates of the effect on the trajectory seemed to coincide with the tracked results. So I guess you have to stay on to some of those things.

SC Rog. Okay, we'll go ahead and dump it.

CAPCOM Okay.

SC Houston, Apollo 8.

CAPCOM Rog, go ahead.

SC You planning on using our computer any time in the near future, I thought I'd do a little P-37.

CAPCOM Apollo 8, Houston. You can go ahead and run that 37 and we'll going to kind of watch that from the ground, , too, and see how it works out. A couple of items that are just of general interest in the trajectory world. Looks like the uncertainty and position was about 12 miles. Your uncertainty in velocity is about a quarter of a foot per second. And the perigee altitude of uncertainty is 5 miles.

SC Rog. Understand. Just for information, perhaps you read it out on the ground. I ran our perigee altitude determination. First of all, P-21, the star state vector that we navigated with, we have plus 84.7 mile altitude and then we ran out your state vector that you

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updated with us the last time. We got 64.2 and then I ran P-30, using our state vector and got 82.6 nautical miles. These are all plus.

CAPCOM That's good.

SC What I'm going to attempt to do on P-37 is to input your delta V on your TMI plus 44 and use that 44 burn time. Notice that the velocity is a little high. We might not be able to do a normal P-37 but we'll give it a try.

SC Houston, one more question then before I start. Did you notice on this last update PAD, this minus MANZ 1. Was that referring to the P-37 fast return or the nominal maneuver which you gave me?

CAPCOM Apollo 8, that's referring to the fast return procedures.

SC Okay.

SC Houston, Apollo 8.

CAPCOM Go ahead.

SC Are you following my procedure?

CAPCOM That's affirmative.

SC Okay, this happened yesterday. too. I'm trying to load the delta V you gave us in the maneuver G alignment 44. It's in P-37, but I keep getting an operator error everytime I try to load zeros for the termination for the middle and corner. Do you know what I'm doing wrong in that position?

CAPCOM Okay, stand by.

CAPCOM Apollo 8, Houston.

SC Okay, go ahead. I can take it.

CAPCOM Okay, looks like the decimal point in R2 under NOUN 60 is on the extreme right-hand side so the proper load will be 06070. Over.

SC Ah, so! Okay, fine. Thank you. I'll update my checklist. Don't know what I want to update it for, I can't read.

END OF TAPE

PAO This is Apollo Control Houston at 38 hours 6 minutes into the flight of Apollo 8. At the present time the spacecraft is 139 151 nautical miles from Earth and traveling at a speed of 4122 feet per second. In the last few minutes we had a conversation with Jim Lovell aboard the spacecraft. Lovell gave us another of the periodic updates that he has been passing down on the optic system used in conjunction with the onboard guidance and navigation equipment. Lovell again noted, as he has in the past, that he is getting a bank of light through the field of view of his scanning telescope. This is a multiple use device. One of the uses that the crew would make of it is to locate and identify a particular constellation that they would be looking at through the sextant which is a 28 power device, giving them much greater magnification. The sextant would be pointing at a particular star in a constellation. The use of the scanning telescope is to identify the constellation that the sextant star is located in and then confirm that they are in fact on the proper star. It has been our observation here on the ground that the crew has been able to carry out the required sighting maneuvers, but Lovell has on occasions remarked that there appears to be some light scattering back into the field of view of the scanning telescope and obscuring part of his visibility. We will play back the tape of his comments on that particular situation and then stand by for any live communication with the spacecraft.

CAPCOM Apollo 8, Houston. We are about to hand over to another site so you may lose lock momentarily.

SC Roger, Houston. Did you receive the results of the P-37?

CAPCOM Sure did. Looks pretty good here.

SC I concur.

CAPCOM Apollo 8, Houston through Honeysuckle. The switch is completed.

SC You are loud and clear.

CAPCOM Roger.

SC Houston, Apollo 8.

CAPCOM Go ahead.

SC I have a comment on the optics we're in PTC right now. We are passing the -- we have the roll of about 182 with about 226 pitch ... I can rotate the shaft all the way around at this particular attitude. I have kept this band of light at about 10 degrees the other side of the M line. It varies in intensity with the shaft position. However it is there with this particular attitude.

CAPCOM Okay. Thank you. Jim we have just been looking at your mark with respect to accuracy and they figure they are within a couple of thousandths of a degree

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of the theoritical optimum. The integrater seems to bear that out.

SC Well i hope that they are enough to get us home if we have to use them.

CAPCOM Well, I am getting a lot of confidence in your ability to run that mystery show now.

SC Hey, Jim, we have to spend four more days up here with him, will you take it easy. He is already talking about going back to MIT as a professor.

CAPCOM HAHAHHAHA.

END OF TAPE

APOLLO 8 MISSION COMMENTARY, 12/22/68, GET 384100, CST 10:33p 130/1

PAO This is Apollo Control Houston. At 38 hours 41 minutes into the flight of Apollo 8. We have had no communications with the crew in the past 20 minutes since our previous announcement. At the present time, Apollo 8 is in an altitude of 140,600 nautical miles, traveling at a speed of 4,083 feet per second. We continue to have a very quiet period, both here in Mission Control Center and on the flight plan. We have gotten a call from the spacecraft and we will pick that up now.

CAP COM You sure do sound wide awake.

SC hello Houston. Apollo 8. How do you read?

CAP COM Apollo 8. Houston. We read you loud and clear. How me?

GOSS COMPASS Honeysuckle network. Goss Compass. How do you read?

SC Houston, this is Apollo 8. How do you read?

CAP COM Loud and clear, Apollo 8.

GOSS COMPASS Go ahead Honeysuckle, how do you read?

GOSS COMPASS Well, I would like to say hello to all of you in Australia. How is everything down there? Pretty good so far. Thank you.

GOSS COMPASS Honeysuckle, Houston Network, on Goss Compass. How do you read?

HONEYSUCKLE Network, this is Honeysuckle reading at 5 5.

GOSS COMPASS Roger.

CAP COM Apollo 8. Houston. Apollo 8. Houston. Apollo 8. Houston. Over.

PAO This is Apollo Control. We are apparently having some problems with direct communication from Houston to the spacecraft. We are reading them loud and clear. But at the present time we are having to relay information through the Honeysuckle maintenance operation personnel to the spacecraft and we are checking into the lines between here and Honeysuckle, Australia to determine just where the problem lays.

SC Hey, if you all start having ground switching problems, how about having some place that has comm come in and tell us about it. Will you please?

CAP COM Roger. Apollo 8. That's what we have been trying to do. Some of our problem seems to be getting from here to that thing.

SC Houston. Apollo 8. How do you read?

CAP COM Apollo 8. Houston, loud and clear. How me?

APOLLO 8 MISSION COMMENTARY, 12/22/68, GET 384100, CST 10:33p 130/2

SC Houston. Apollo 8.
CAP COM Apollo 8. Houston. Read you loud and
clear. (pause) Apollo 8. Houston.
SC Roger. Go ahead Houston. Apollo 8.
CAP COM Roger. We read you loud and clear and
copy your remarks about having our remote site talk to you.
Some of our problem has been in going from MCC to the remote
site. We will attempt to do that any time we can.
SC That's right. I just thought you were
having problems.
CAP COM Roger.

END OF TAPE

APOLLO 8 MISSION COMMENTARY, 12/22/68, GET 385300, CST 10:45 131/1

PAO This is Apollo Control. Having reestablished two-way communication with the spacecraft, it appears that we won't hear anymore from the crew at least for the time being. We did hear from Frank Borman at the time that indicates that he is no longer resting, at least is not asleep. Frank had indicated earlier that he would attempt to get some rest beginning in about 37 hours ground elapse time, and we heard from here they're at about 38 hours 45 minutes into the flight. We do not have an evaluation as to what the problem was with the uplink. The problem appeared to lie between Houston and the site at Honeysuckle. We were able to relay messages from Honeysuckle to the spacecraft, but we were not able to talk directly with the spacecraft from Houston. That problem as we timed here began 38 hours 42 minutes, and we had calm reestablished at about 38 hours 48 minutes about 6 minutes after the call was first put in. At the present time Apollo 8 is at an altitude of 141 197 nautical miles, and it's velocity is 4067 feet per second. I believe Cap Com Ken Mattingly is preparing to put in another call to the crew. We'll stand by briefly for that.

END OF TAPE

APOLLO 8 MISSION COMMENTARY, 12/22/68, GET 391000, CST 10:00 132/1

PAO This is Apollo Control at Houston 39 hours 10 minutes into the flight of Apollo 8. We've had no further communications with the crew since our previous report, and we do have a preliminary report on the cause of our communication problem through Honeysuckle. And it appears that the problem was with a control monitor panel at the Honeysuckle, Australia site. The exact nature of the problem with this piece of electronic equipment is not known at this time. It is associated with the unified S-band system at Honeysuckle. The problem as we said occurred at about 38 hours 42 minutes ground elapse time and was corrected some 6 minutes later. And it's effect was to prevent direct communications from Houston to the spacecraft; it did not effect communications from the spacecraft to Houston. And we were able to relay information to the crew through the maintenance and operation people at Honeysuckle. At the present time here in Mission Control, we are going through a change in shift. Flight Director Glenn Lunney and his black team of flight controllers are coming to replace Milton Windler. Gerald Carr will be the Astronaut Capsule Communicator replacing Astronaut Tom Mattingly. And at the present time the shift going off is briefing the oncoming shift on activities during the shift that is concluding at this time. At the present time Apollo 8 is at an altitude of 141 777 nautical miles, and the velocity continuing to drop down slowly, now down to 4052 feet per second. At 39 hours 12 minutes into the flight this is Apollo Control.

END OF TAPE

APOLLO 8 MISSION COMMENTARY, 12/22/68, GET 394315, CST 10:34 133/1

PAO This is Apollo Control, Houston, 39 hours 43 minutes 15 second now into the flight, Apollo 8. The Apollo 8 spacecraft at the present time is at an altitude of 143 023 nautical miles; our current velocity reading 4019.1 feet per second. As had been previously reported, we were undergoing a change of shift briefing. We have change of shift here in Mission Control, I should say, we have done that. The Glenn Lunney team of black team of controllers is now on duty. Glenn's first action as he took over was to bring up each member of his flight control team with an amber light, and had them give to him a status report on how we look. And at the present time we look very good. The spacecraft systems all look good at this time. Our current spacecraft weight reading is 62 970 pounds. The communications problem briefly that developed toward the later part of the earlier shift of flight controllers had been isolated to be in the control monitor panel in the Honeysuckle tracking station, and was further isolated to be a relay in that panel. We had one brief transmission with the crew since the black team has been aboard, and we'll play that for you now.

END OF TAPE

APOLLO 8 MISSION COMMENTARY, 12/22/68, GET: 395300, CST: 10:45p 134/1

PAO Apollo Control Houston. 39 hours
53 minutes. This is brief clarify - clarifying report on
last transmission. The conversation between the spacecraft
Apollo 8, and Capsule Communicator, Jerry Carr, can perhaps
be best identified by its brevity. Apparently it did not
get recorded on tape, only some 8 seconds in length. However
this transmission was strictly an acknowledgment of communica-
tions between the spacecraft and the ground. We thought you
should know that - that this time since it apparently did
not play with our previous announcement. So at 39 hours
54 minutes, this is Apollo Control Houston.

END OF TAPE